

WHAT IS CLAIMED IS:

Sub A 1. A single-crystalline film having a molecular alignment order provided through phase transition from a liquid crystal phase.

Sub B, contd 2. A single-crystalline film according to Claim 1, wherein the liquid crystal phase includes a lower order liquid crystal phase and a higher order liquid crystal phase.

10 3. A single-crystalline film according to Claim 1, wherein the liquid crystal phase includes a smectic phase.

15 4. A single-crystalline film according to Claim 3, comprising a smectic liquid crystal material providing a uniform molecular alignment in a smectic layer.

20 *Sub B* 5. A single-crystalline film according to Claim 4, wherein the smectic liquid crystal material has a molecular structure which is symmetrical with respect to its molecular long axis.

25 *Sub A* 6. A process for producing a single-crystalline film, comprising:
a step of disposing a smectic liquid crystal

material exhibiting a uniform molecular alignment in a smectic layer between a pair of boundaries having a thickness regulation function, and

a crystallization step of cooling and

5 solidifying the smectic liquid crystal material through its smectic phase into a single-crystalline film.

7. A process according to Claim 6, wherein the
10 smectic liquid crystal material has a molecular structure which is symmetrical with respect to its molecular long axis.

8. A process according to Claim 6, wherein the crystallization step includes sub-steps of once forming a poly-crystal state by causing phase transition from a liquid crystal phase and transforming the polycrystal state into a single crystal state.

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9. A process according to any one of Claims 6 - 8, wherein the crystallization step includes sub-steps of once cooling the liquid crystal material into a crystal phase and holding the liquid crystal material 25 for a prescribed period at a temperature which is in proximity to a crystal-liquid crystal transition temperature within the crystal phase temperature range.

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